INFORMATION PROCESSING APPARATUS, INFORMATION PROCESSING METHOD, COMPUTER PROGRAM, AND IMAGE PROCESSING SYSTEM

TECHNICAL FIELD

[0001] The technology described in the present specification relates to an information processing apparatus, information processing method, computer program, and image processing system for processing an image that tracks the movement of an observer.

BACKGROUND ART

[0002] An image display device, i.e., head-mounted display, worn on the user's head or face has been known. The head-mounted display is provided with an image display unit on both the right and left eyes and is configured to be capable of controlling visual and auditory perception using together with a headphone. The configuration for blocking the outside world entirely when it is worn on the head increases the virtual reality during viewing. The head-mounted display is capable of projecting a different video image onto each eye and is capable of presenting a 3D image by displaying an image having parallax on the left and right eyes.

[0003] This type of head-mounted display forms a virtual image on the retina of the eye to allow the user to observe it. In this regard, the virtual image is formed on the side of an object that is situated closer to the lens than the focal length. As one example, there has been developed a head-mounted display that forms an enlarged virtual image of a display image on the user's pupil by placing a virtual image optical system of a wide viewing angle to be spaced by 25 millimeters away from the front of the pupil and by placing a display panel having a size of the effective pixel range of about 0.7 inches further in front of the wide viewing angle optical system (e.g. see Patent Literature 1).

[0004] The user is able to observe an image obtained by segmenting a part of the wide-angle image using this type of head-mounted display. As one example, there has been developed a head-mounted display that allows reality experience of a video image of 360 degrees rotation view to be achieved by installing a head motion tracking device including a gyro sensor or the like on the head and by causing it to track the movement of the user's head (see Patent Literatures 2 and 3). It is possible to implement the free viewpoint viewing and viewpoint moving environment by moving a display area in the wide-angle image to cancel the head's movement detected by the gyro sensor.

SUMMARY OF INVENTION

Technical Problem

[0005] The object of the technology described in the present specification is to provide an improved information processing apparatus, information processing method, computer program, and image processing system, capable of suitably processing an image that tracks the movement of an observer.

Solution to Problem

[0006] The present application has been made in view of the aforementioned problems, and a technology described in claim **1** is an information processing apparatus including: a receiver configured to receive first information on a posture of a head of an observer and second information on a posture of a body other than the head of the observer; and an image rendering processing unit configured to generate a display image corresponding to a posture of the observer based on the first information and the second information.

[0007] According to a technology described in claim **2**, the receiver of the information processing apparatus according to claim **1** receives at least a posture of a trunk of the observer as the second information, and the image rendering processing unit generates a free viewpoint image that tracks a posture of the head of the observer by orienting a line-of-sight direction of the observer in a free viewpoint space based on the first information and by orienting an orientation (viewpoint position) of the body of the observer in the free viewpoint space based on a posture of the trunk of the observer obtained from the second information.

[0008] According to a technology described in claim **3**, the image rendering processing unit of the information processing apparatus according to claim **2**, when receiving a control signal used to instruct the observer to move in the free viewpoint space as an input, determines a point after movement (viewpoint position) by recognizing, as a front direction, an orientation of a body oriented based on a posture of the trunk of the observer obtained from the second information.

[0009] According to a technology described in claim **4**, the image rendering processing unit of the information processing apparatus according to claim **1** generates a free viewpoint image that tracks a posture of the head of the observer by orienting a line-of-sight direction of the observer in a free viewpoint space based on the first information and by arranging in a fixed position oriented based on the posture obtained from the second information.

[0010] According to a technology described in claim **5**, the receiver of the information processing apparatus according to claim **1** receives at least a posture of the trunk of the observer as the second information, and the image rendering processing unit generates a free viewpoint image that tracks a posture of the head of the observer by orienting a line-of-sight direction of the observer in a free viewpoint space based on the first information, by orienting an orientation (viewpoint position) of the body of the observer in the free viewpoint space based on a posture of the trunk of the observer obtained from the second information, and by arranging a predetermined image widget in a fixed position oriented based on a posture of the trunk of the observer.

[0011] According to a technology described in claim **6**, the information processing apparatus according to any one of claims **1** to **5**, further includes a calibration processing unit configured to acquire a calibration parameter. The image rendering processing unit performs image generation using posture information corrected by the calibration parameter.

[0012] According to a technology described in claim **7**, the calibration processing unit of the information processing apparatus according to claim **8**, based on head posture information obtained from the first information and second posture information obtained from the second information, calculates a calibration parameter used to correct the second posture information and corrects the second posture information using the calibration parameter.

[0013] According to a technology described in claim **8**, the calibration processing unit of the information processing